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MEMORANDUM

TO: Michael Berkoff, USEPA

REF. NO.: 056393-08

FROM: Greg Carli/Jodie Dembowske/18

DATE: January 7, 2013

C.C.: 12th Street Landfill Technical Team:

Richard Gay, Weyerhaeuser; Kristi Zakrzewski, MDEQ;
John Bradley, MDEQ; Jeff Keiser, CH2MHill;
Scott Hutsell, CH2MHill



RE: **October 2012 Quarterly Groundwater Sampling Results
12th Street Landfill-Operable Unit No. 4-Allied Paper/Portage Creek/Kalamazoo River
Superfund Site, Otsego Township, Michigan**

This memorandum has been prepared by Conestoga-Rovers & Associates (CRA) to summarize the results of the October 2012 semiannual groundwater sampling event performed at the 12th Street Landfill, Operable Unit No. 4 – Allied Paper/Portage Creek/Kalamazoo River Superfund Site, located in Otsego Township, Michigan between October 22 and 23, 2012.

The October 2012 sampling event was the sixth sampling event performed as part of the Operation, Maintenance, and Monitoring (OM&M) activities at the Site. The most recent sampling event prior to this was the July 2012 semiannual event.

A total of 15 groundwater monitoring wells (MW-101S, MW-101D, MW-102S, MW-102D, MW-103D, MW-104S, MW-104D, MW-105S, MW-105D, MW-106S, MW-106D, MW-107S, MW-108S, MW-108D, and MW-109D) were installed in February 2011, at varying depths, around the perimeter of the landfill to complete the OM&M monitoring well network. The locations of the monitoring wells are shown on Figure 1. Prior to the October 2012 sampling event, CRA collected static water levels for 2 weeks from each well and the river staff gauge, as required by the OM&M Plan (April 2012). Monitoring well construction details and groundwater elevations from the water level collection event are presented in Table 1. Figure 2 presents the shallow groundwater elevation contours, and Figure 3 presents the deep groundwater elevation contours, both from the pre-sampling water level event on October 22, 2012.

During the October 2012 groundwater sampling event, samples were collected from each monitoring well in the monitoring well network. Field measurements of pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), conductivity (mS/cm), temperature (Deg C), and turbidity (NTU) were collected. Samples were collected using low flow sampling and submitted for laboratory analysis of polychlorinated biphenyls (PCBs), target analyte list (TAL) for inorganics, cyanide, and TCL volatile compounds (VOCs). The October 2012 analytical results were compared to Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria, identified by Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD)

Op Memo No. 1, updated September 28, 2012, pursuant to 1994 PA 451, as amended. The October 2012 analytical results and field parameters are presented in Table 2.

The analytical results of the October 2012 sampling event yielded only mercury exceeding relevant Part 201 Cleanup Criteria and Part 213 Risk-Based Criteria at one monitoring well. The groundwater surface water interface (GSI) criterion of 0.0013 micrograms per liter ($\mu\text{g}/\text{L}$) for mercury was exceeded at MW-106S (0.0118 $\mu\text{g}/\text{L}$).

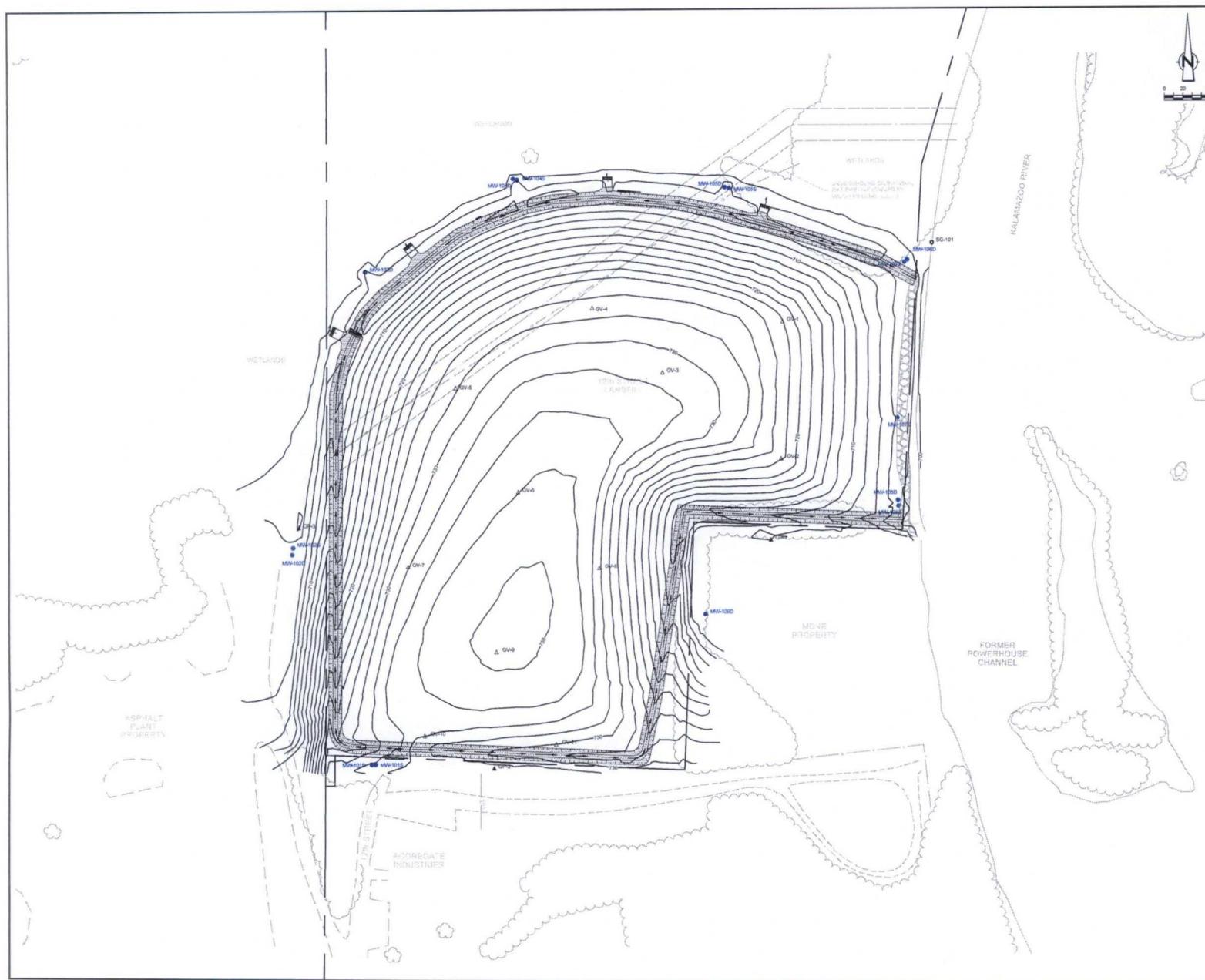
The analytical results for metals exceeding GSI criteria from previous sampling events performed in April 2011, October 2011, February 2012, April 2012 and July 2012 are shown on Figure 4 in addition to the October 2012 exceedance. Figure 4 also includes total PCB detections from all six sampling events.

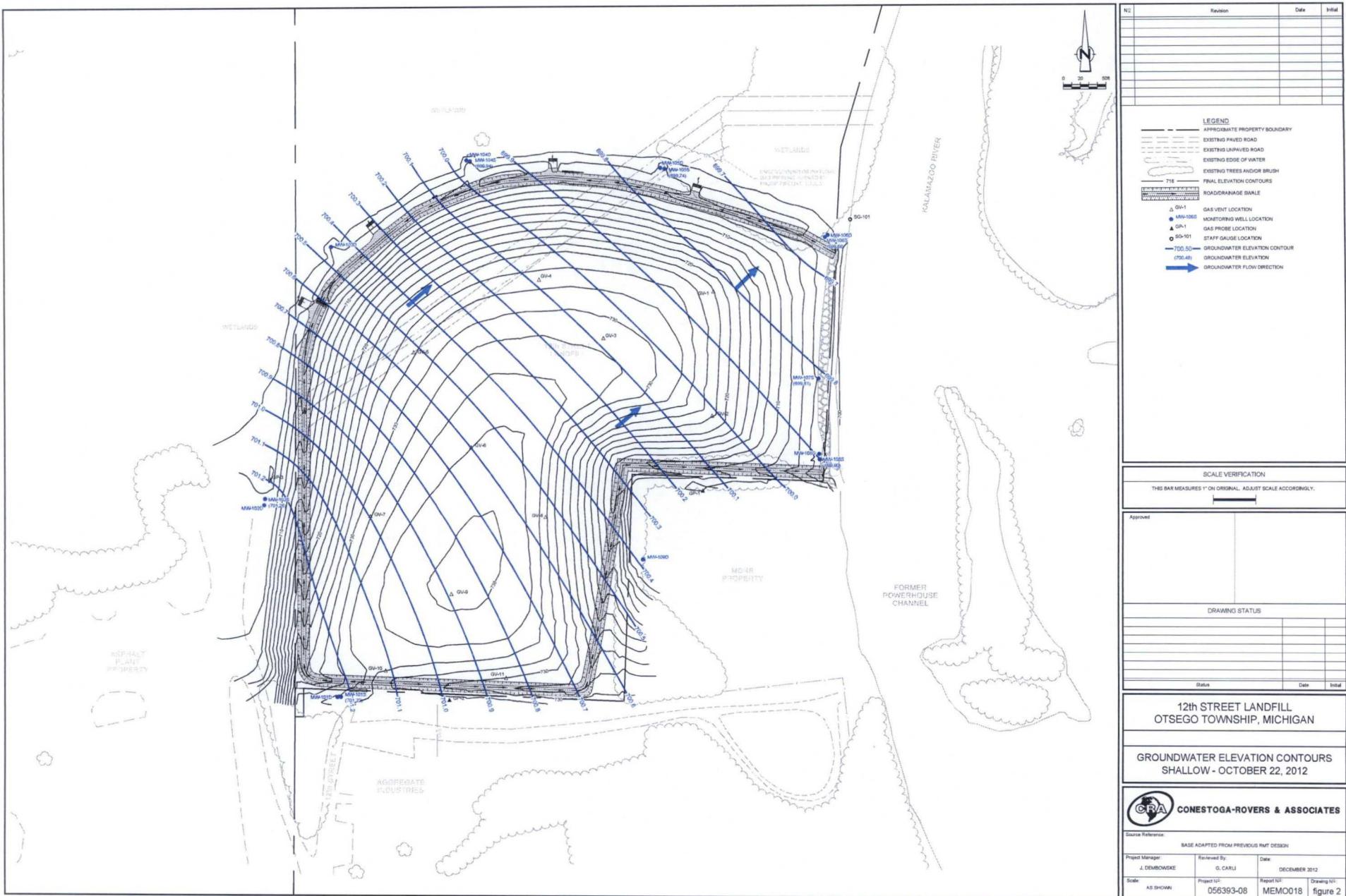
The following summarizes the October 2012 analytical results:

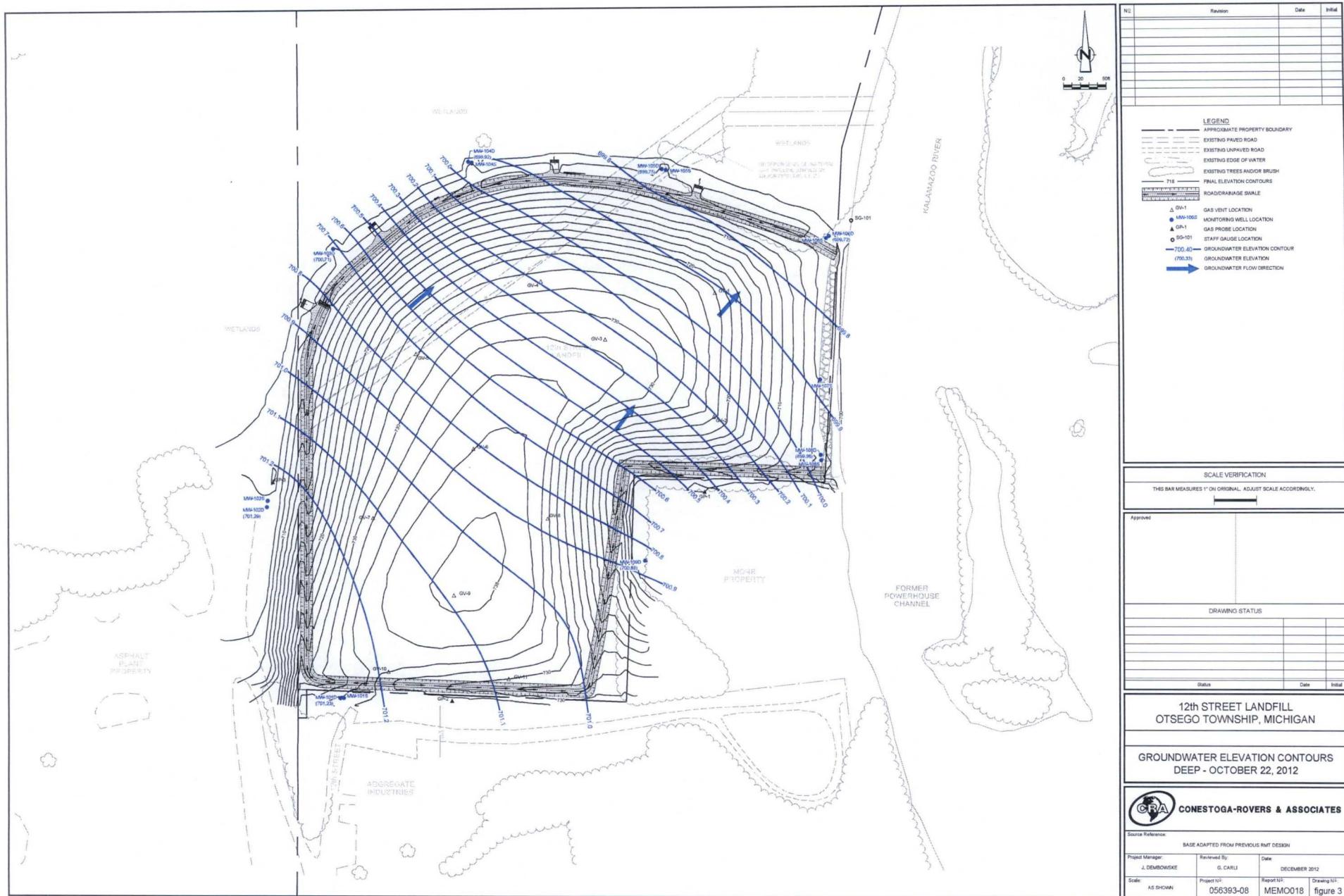
- PCBs parameters were non-detect
- Mercury was detected in one of the October 2012 samples at MW-106S. The detection of 0.0118 $\mu\text{g}/\text{L}$ was above the GSI criteria of 0.0013 $\mu\text{g}/\text{L}$
- Cyanide was non-detect
- VOC parameters were non-detect

Quarterly and semiannual groundwater monitoring will continue at the Site as described in the OM&M Plan, submitted to United States Environmental Protection Agency (USEPA) on May 9, 2011, and revised on April 18, 2012. A revised OM&M Plan was submitted to the USEPA December 28, 2012 based on comments received by the USEPA on November 30, 2012.

The next sampling event is scheduled to occur in January/February 2013 and will consist of a semiannual event as outlined in the OM&M Plan [i.e., TCL VOCs, SVOCs, PCBs, total analyte list (TAL) metals, and polychlorinated dibenzodioxins/ polychlorinated dibenzofurans (PCDD/PCDF)].







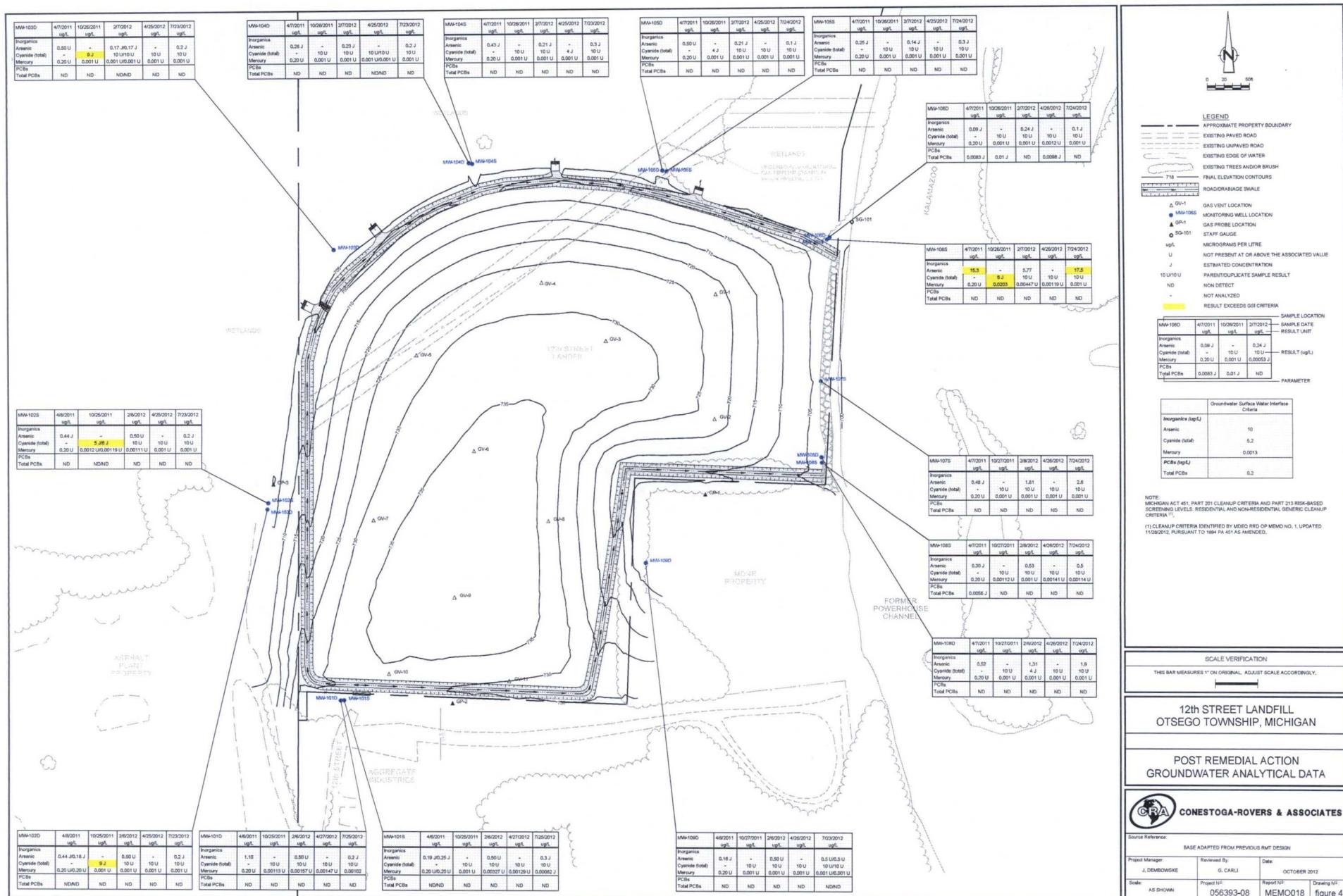


TABLE 1

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GROUNDWATER MONITORING WELLS
OCTOBER 2012 WATER LEVEL DATA
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

| Locations | Ground Surface | Reference | Monitoring | Screened Interval (feet AMSL) | October 2012 Water Level Data | | | | | | |
|------------------|-----------------------|------------------|-------------------|---|--|-----------|-----------|-----------|-----------|-----------|-----------|
| | Elevation | Elevation | Well Depth | | Water Level Elevation (feet AMSL) | | | | | | |
| | (feet AMSL) | (feet AMSL) | (feet bgs) | | 8-Oct-12 | 10-Oct-12 | 12-Oct-12 | 15-Oct-12 | 17-Oct-12 | 19-Oct-12 | 22-Oct-12 |
| MW-101S | 734.35 | 737.46 | 39 | 702.35 to 695.35 | 700.46 | 700.46 | 700.49 | 701.06 | 700.96 | 701.08 | 701.22 |
| MW-101D | 734.33 | 737.14 | 75 | 664.33 to 659.33 | 700.44 | 700.47 | 700.26 | 701.13 | 700.97 | 701.07 | 701.23 |
| MW-102S | 704.18 | 707.36 | 10 | 701.18 to 694.18 | 700.56 | 700.56 | 700.58 | 701.21 | 701.06 | 701.21 | 701.26 |
| MW-102D | 704.43 | 707.43 | 45 | 664.43 to 659.43 | 700.59 | 700.61 | 700.61 | 701.25 | 701.09 | 701.24 | 701.29 |
| MW-103D | 704.37 | 707.36 | 35 | 674.37 to 669.37 | 699.92 | 699.98 | 699.98 | 700.70 | 700.43 | 700.62 | 700.71 |
| MW-104S | 703.86 | 706.55 | 25.5 | 684.86 to 677.86 | 699.42 | 699.50 | 699.48 | 700.26 | 699.93 | 700.15 | 699.94 |
| MW-104D | 703.48 | 706.42 | 45 | 663.48 to 658.48 | 699.45 | 699.53 | 699.52 | 700.29 | 699.95 | 700.17 | 699.92 |
| MW-105S | 704.89 | 707.86 | 12 | 699.89 to 692.89 | 699.22 | 699.31 | 699.29 | 700.21 | 699.69 | 700.00 | 699.74 |
| MW-105D | 704.78 | 707.89 | 47 | 662.78 to 657.78 | 699.42 | 699.49 | 699.45 | 700.37 | 699.87 | 700.14 | 699.75 |
| MW-106S | 703.88 | 706.96 | 9 | 701.88 to 694.88 | 699.13 | 699.18 | 699.17 | 700.25 | 699.61 | 700.04 | 699.66 |
| MW-106D | 703.66 | 706.36 | 45 | 664.66 to 659.66 | 699.27 | 699.32 | 699.29 | 700.30 | 699.69 | 700.03 | 699.72 |
| MW-107S | 703.76 | 706.73 | 13 | 695.76 to 690.76 | 699.35 | 699.39 | 699.38 | 700.39 | 699.78 | 700.12 | 699.81 |
| MW-108S | 703.32 | 706.21 | 9 | 701.32 to 694.32 | 699.50 | 699.51 | 699.51 | 700.51 | 699.91 | 700.23 | 699.96 |
| MW-108D | 703.39 | 706.16 | 45 | 663.39 to 658.39 | 699.44 | 699.44 | 699.47 | 700.47 | 699.84 | 700.17 | 699.90 |
| MW-109D | 707.41 | 710.46 | 23 | 689.41 to 684.41 | 700.04 | 700.05 | 700.06 | 700.88 | 700.53 | 700.73 | 700.88 |
| SG-101 | 700.9 | 703.05 | - | - | 698.83 | 698.87 | 698.87 | 700.07 | 699.28 | 699.66 | 699.27 |

TABLE 2

SUMMARY OF OCTOBER 2012 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

| Sample Location | Michigan Act 451, Part 201 Cleanup Criteria and Part 213, Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria^(a) | | | | | | | | | |
|--|--|-------------------------------------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------|
| | Residential | Non-Residential | Groundwater | MW-101D | MW-101S | MW-102D | MW-102S | MW-103D | MW-104D | |
| Sample Identification | Drinking Water^(a) | Drinking Water^(b) | Surface Water Interface^(a) | GW-56393-102312-JV-113 | GW-56393-102312-JV-112 | GW-56393-102312-JV-110 | GW-56393-102312-JV-109 | GW-56393-102312-JV-108 | GW-56393-102312-JV-107 | |
| Sample Date | | | | 10/23/2012 | 10/23/2012 | 10/23/2012 | 10/23/2012 | 10/23/2012 | 10/22/2012 | |
| Sample Type | | | | | | | | | | |
| Screen Depth | | | | Screen_Depth: (70-75) | Screen_Depth: (32-29) | Screen_Depth: (40-45) | Screen_Depth: (3-10) | Screen_Depth: (30-35) | Screen_Depth: (40-45) | |
| Sample Elevation (feet AMSL) | | | | 664.33-589.33 | 702.35-663.35 | 664.43-619.43 | 701.18-691.18 | 674.37-639.37 | 633.48-618.48 | |
| Volatile Organic Compounds (VOCs) | Units | | | | | | | | | |
| Acetone | ug/L | 730 | 2100 | 1700 | 20 U | 20 U |
| Benzene | ug/L | 5 | 5 | 200 | 0.50 U | 0.50 U |
| Bromodichloromethane | ug/L | 80 | 80 | ID | 0.50 U | 0.50 U |
| Bromoform | ug/L | 80 | 80 | ID | 0.50 U | 0.50 U |
| Bromomethane (Methyl bromide) | ug/L | 10 | 29 | 35 | 0.50 U | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | ug/L | 13000 | 38000 | 2200 | R | R | R | R | R | R |
| Carbon disulfide | ug/L | 800 | 2300 | ID | 0.50 U | 0.50 U |
| Carbon tetrachloride | ug/L | 5 | 5 | 45 | 0.50 U | 0.50 U |
| Chlorobenzene | ug/L | 100 | 100 | 25 | 0.50 U | 0.50 U |
| Chloroethane | ug/L | 430 | 1700 | 1100 | 0.50 U | 0.50 U |
| Chloroform (Trichloromethane) | ug/L | 80 | 80 | 350 | 0.50 U | 0.50 U |
| Chloromethane (Methyl chloride) | ug/L | 260 | 1100 | ID | 0.50 U | 0.50 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/L | 0.2 | 0.2 | - | 2.0 U | 2.0 U |
| Dibromochloromethane | ug/L | 80 | 80 | ID | 0.50 U | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | ug/L | 0.05 | 0.05 | 5.7 | 2.0 U | 2.0 U |
| 1,2-Dichlorobenzene | ug/L | 600 | 600 | 13 | 0.50 U | 0.50 U |
| 1,3-Dichlorobenzene | ug/L | 6.6 | 19 | 28 | 0.50 U | 0.50 U |
| 1,4-Dichlorobenzene | ug/L | 75 | 75 | 17 | 0.50 U | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | ug/L | 1700 | 4800 | ID | 0.50 U | 0.50 U |
| 1,1-Dichloroethane | ug/L | 880 | 2500 | 740 | 0.50 U | 0.50 U |
| 1,2-Dichloroethane | ug/L | 5 | 5 | 360 | 0.50 U | 0.50 U |
| 1,1-Dichloroethene | ug/L | 7 | 7 | 130 | 0.50 U | 0.50 U |
| cis-1,2-Dichloroethene | ug/L | 70 | 70 | 620 | 0.50 U | 0.50 U |
| trans-1,2-Dichloroethene | ug/L | 100 | 100 | 1500 | 0.50 U | 0.50 U |
| 1,2-Dichloropropene | ug/L | 5 | 5 | 230 | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | - | - | - | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | - | - | - | 0.50 U | 0.50 U |
| Ethylbenzene | ug/L | 74 | 74 | 18 | 0.50 U | 0.50 U |
| 2-Hexanone | ug/L | 1000 | 2900 | ID | 20 U | 20 U |
| Isopropyl benzene | ug/L | 800 | 2300 | 28 | 2.0 U | 2.0 U |
| Methyl tert butyl ether (MTBE) | ug/L | 40 | 40 | 7100 | 0.50 U | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | ug/L | 1800 | 5200 | ID | 20 U | 20 U |
| Methylene chloride | ug/L | 5 | 5 | 1500 | 2.0 U | 2.0 U |
| Styrene | ug/L | 100 | 100 | 80 | 0.50 U | 0.50 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 8.5 | 35 | 78 | 0.50 U | 0.50 U |
| Tetrachloroethene | ug/L | 5 | 5 | 60 | 0.50 U | 0.50 U |
| Toluene | ug/L | 790 | 790 | 270 | 0.50 U | 0.50 U |
| 1,2,4-Trichlorobenzene | ug/L | 70 | 70 | 99 | 2.0 U | 2.0 U |
| 1,1,1-Trichloroethane | ug/L | 200 | 200 | 89 | 0.50 U | 0.50 U |
| 1,1,2-Trichloroethane | ug/L | 5 | 5 | 330 | 0.50 U | 0.50 U |
| Trichloroethene | ug/L | 5 | 5 | 200 | 0.50 U | 0.50 U |
| Trichlorofluoromethane (CFC-11) | ug/L | 2600 | 7300 | - | 0.50 U | 0.50 U |
| Vinyl chloride | ug/L | 2 | 2 | 13 | 0.50 U | 0.50 U |
| o-Xylene | ug/L | 280 | 280 | 41 | 0.50 U | 0.50 U |
| m&p-Xylenes | ug/L | - | - | - | 0.50 U | 0.50 U |

TABLE 2

SUMMARY OF OCTOBER 2012 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

| <i>Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-</i> | | | | | | | | | | |
|---|---|-------------------------------------|--------------------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <i>Sample Location</i> | <i>Residential Generic Cleanup Criteria⁽¹⁾</i> | | | | <i>MW-101D</i> | <i>MW-101S</i> | <i>MW-102D</i> | <i>MW-102S</i> | <i>MW-103D</i> | <i>MW-104D</i> |
| | <i>Residential</i> | <i>Non-Residential</i> | <i>Groundwater</i> | <i>Surface Water Interface⁽²⁾</i> | <i>GW-56393-102312-JV-113</i> | <i>GW-56393-102312-JV-112</i> | <i>GW-56393-102312-JV-110</i> | <i>GW-56393-102312-JV-109</i> | <i>GW-56393-102312-JV-108</i> | <i>GW-56393-102312-JV-107</i> |
| <i>Sample Identification</i> | <i>Drinking Water^(a)</i> | <i>Drinking Water^(b)</i> | <i>Groundwater</i> | <i>Surface Water Interface⁽²⁾</i> | <i>10/23/2012</i> | <i>10/23/2012</i> | <i>10/23/2012</i> | <i>10/23/2012</i> | <i>10/23/2012</i> | <i>10/22/2012</i> |
| <i>Sample Date</i> | | | | | | | | | | |
| <i>Sample Type</i> | | | | | | | | | | |
| <i>Screen Depth</i> | | | | | <i>Screen_Depth: (70-75)</i> | <i>Screen_Depth: (32-29)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (3-10)</i> | <i>Screen_Depth: (30-35)</i> | <i>Screen_Depth: (40-45)</i> |
| <i>Sample Elevation (feet AMSL)</i> | | | | | <i>664.33-589.33</i> | <i>702.35-663.35</i> | <i>664.43-619.43</i> | <i>701.18-691.18</i> | <i>674.37-639.37</i> | <i>633.48-618.48</i> |
| | <i>Units</i> | | | | | | | | | |
| Metals | | | | | | | | | | |
| Cyanide (amenable) | ug/L | 200 | 200 | - | 10 U |
| Cyanide (total) | ug/L | 200 | 200 | 5.2 | 10 U |
| Magnesium | ug/L | 400000 | 1100000 | - | 23300 | 24100 | 23200 | 24300 | 22100 | 23200 |
| Mercury | ug/L | 2 | 2 | 0.0013 | 0.001 U |
| Sodium | ug/L | 120000 | 350000 | - | 23800 | 23700 | 20400 | 22000 | 18800 | 21600 |
| PCBs | | | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | - | - | - | 0.020 U |
| Aroclor-1221 (PCB-1221) | ug/L | - | - | - | 0.040 U |
| Aroclor-1232 (PCB-1232) | ug/L | - | - | - | 0.020 U |
| Aroclor-1242 (PCB-1242) | ug/L | - | - | - | 0.020 U |
| Aroclor-1248 (PCB-1248) | ug/L | - | - | - | 0.020 U |
| Aroclor-1254 (PCB-1254) | ug/L | - | - | - | 0.020 U |
| Aroclor-1260 (PCB-1260) | ug/L | - | - | - | 0.020 U |
| Total PCBs | ug/L | 0.5 | 0.5 | 0.2 | ND | ND | ND | ND | ND | ND |
| Field Parameters | | | | | | | | | | |
| Conductivity | mS/cm | - | - | - | 0.785 | 0.788 | 0.738 | 0.795 | 0.712 | 0.830 |
| Dissolved oxygen (DO) | mg/L | - | - | - | 2.79 | 2.57 | 2.40 | 0.44 | 1.10 | 1.94 |
| Oxidation reduction potential (ORP) | millivolts | - | - | - | 116.5 | 122.6 | 120.2 | 112.8 | 143.6 | 95.7 |
| pH | s.u. | 6.5 - 8.5 | 6.5 - 8.5 | - | 7.17 | 7.02 | 7.11 | 6.92 | 6.94 | 7.17 |
| Temperature | Deg C | - | - | - | 14.17 | 16.04 | 14.30 | 17.16 | 13.21 | 13.78 |
| Turbidity | NTU | - | - | - | 1.10 | 1.10 | 3.27 | 1.73 | 3.61 | 0.71 |

Notes:

⁽¹⁾ Cleanup criteria identified by MDEQ Op Memo No. 1

updated 9/28/12, pursuant to 1994 PA 451 as amended

U - Not present at or above the associated value.

J - Laboratory qualifier - estimated concentration.

UJ - Estimated reporting limit.

R - Rejected.

TABLE 2

SUMMARY OF OCTOBER 2012 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

| Sample Location | MW-104S | MW-105D | MW-105S | MW-106D | MW-106D | MW-106S | MW-107S | MW-108D |
|--|------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|----------------------------|-----------------------------|------------------------------|
| Sample Identification | GW-56393-102212-JV-106 | GW-56393-102212-JV-105 | GW-56393-102212-JV-104 | GW-56393-102212-JV-102 | GW-56393-102212-JV-103 | GW-56393-102212-JV-101 | GW-56393-102212-JV-100 | GW-56393-102212-JV-099 |
| Sample Date | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 |
| Sample Type | | | | | <i>Duplicate</i> | | | |
| Screen Depth | <i>Screen_Depth: (20-25)</i> | <i>Screen_Depth: (42-47)</i> | <i>Screen_Depth: (5-12)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (2-9)</i> | <i>Screen_Depth: (8-13)</i> | <i>Screen_Depth: (40-45)</i> |
| Sample Elevation (feet AMSL) | 684.86-658.86 | 662.70-615.79 | 699.89-687.89 | 664.66-620.66 | 664.66-620.66 | 701.89-692.89 | 695.76-682.76 | 663.39-618.39 |
| Units | | | | | | | | |
| Volatile Organic Compounds (VOCs) | | | | | | | | |
| Acetone | ug/L | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| Benzene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Bromodichloromethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Bromoform | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Bromomethane (Methyl bromide) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | ug/L | R | R | R | R | R | R | R |
| Carbon disulfide | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.11 J | 0.50 U | 0.50 U |
| Carbon tetrachloride | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Chlorobenzene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Chloroethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Chloroform (Trichloromethane) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Chloromethane (Methyl chloride) | ug/L | 0.50 UJ | 0.50 UJ | 0.50 UJ | 0.50 UJ | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Dibromochloromethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| 1,2-Dichlorobenzene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,3-Dichlorobenzene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,4-Dichlorobenzene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | ug/L | 0.50 UJ | 0.50 UJ | 0.50 UJ | 0.50 UJ | 0.50 U | 0.50 U | 0.50 U |
| 1,1-Dichloroethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloroethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.14 J |
| 1,1-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| trans-1,2-Dichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloropropene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Ethylbenzene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 2-Hexanone | ug/L | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| Isopropyl benzene | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Methyl tert butyl ether (MTBE) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | ug/L | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| Methylene chloride | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Styrene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Tetrachloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Toluene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,2,4-Trichlorobenzene | ug/L | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 0.50 U |
| 1,1,1-Trichloroethane | ug/L | 0.50 U | 0.50 U | 0.13 J | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2-Trichloroethane | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Trichlorofluoromethane (CFC-11) | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Vinyl chloride | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| α -Xylene | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| $m\&p$ -Xylenes | ug/L | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |

TABLE 2

SUMMARY OF OCTOBER 2012 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

| <i>Sample Location</i> | <i>MW-104S</i> | <i>MW-105D</i> | <i>MW-105S</i> | <i>MW-106D</i> | <i>MW-106D</i> | <i>MW-106S</i> | <i>MW-107S</i> | <i>MW-108D</i> |
|-------------------------------------|------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|----------------------------|-----------------------------|------------------------------|
| <i>Sample Identification</i> | GW-56393-102212-JV-106 | GW-56393-102212-JV-105 | GW-56393-102212-JV-104 | GW-56393-102212-JV-102 | GW-56393-102212-JV-103 | GW-56393-102212-JV-101 | GW-56393-102212-JV-100 | GW-56393-102212-JV-099 |
| <i>Sample Date</i> | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/23/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 |
| <i>Sample Type</i> | | | | | <i>Duplicate</i> | | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (20-25)</i> | <i>Screen_Depth: (42-47)</i> | <i>Screen_Depth: (5-12)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (2-9)</i> | <i>Screen_Depth: (8-13)</i> | <i>Screen_Depth: (40-45)</i> |
| <i>Sample Elevation (feet AMSL)</i> | 684.86-658.86 | 662.79-615.79 | 699.89-687.89 | 664.66-620.66 | 664.66-620.66 | 701.89-692.89 | 695.76-682.76 | 663.39-618.39 |
| <i>Units</i> | | | | | | | | |
| Metals | | | | | | | | |
| Cyanide (amenable) | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Cyanide (total) | ug/L | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Magnesium | ug/L | 23100 | 24500 | 27700 | 23500 | 23200 | 40900 | 28500 |
| Mercury | ug/L | 0.001 U | 0.001 U | 0.001 U | 0.001 U | 0.001 U | 0.0118 ^b | 0.001 U |
| Sodium | ug/L | 20900 | 22000 | 23800 | 22400 | 22200 | 19100 | 23000 |
| PCBs | | | | | | | | |
| Aroclor-1016 (PCB-1016) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1221 (PCB-1221) | ug/L | 0.040 U | 0.040 U | 0.039 U | 0.040 U | 0.039 U | 0.040 U | 0.040 U |
| Aroclor-1232 (PCB-1232) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.026 U | 0.020 U |
| Aroclor-1242 (PCB-1242) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1248 (PCB-1248) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1254 (PCB-1254) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.0074 J | 0.0057 J | 0.020 U | 0.020 U |
| Aroclor-1260 (PCB-1260) | ug/L | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |
| Total PCBs | ug/L | ND | ND | ND | 0.0074 J | 0.0057 J | ND | ND |
| Field Parameters | | | | | | | | |
| Conductivity | mS/cm | 0.671 | 0.847 | 0.814 | 0.701 | 0.701 | 1.25 | 0.913 |
| Dissolved oxygen (DO) | mg/L | 1.69 | 1.49 | 0.14 | 2.62 | 2.62 | 0.39 | 0.15 |
| Oxidation reduction potential (ORP) | millivolts | 89 | 55.9 | 33 | 94 | 94 | -51 | -60 |
| pH | s.u. | 7.34 | 7.06 | 6.87 | 7.31 | 7.31 | 6.66 | 6.61 |
| Temperature | Deg C | 13.73 | 13.14 | 14.55 | 12.79 | 12.79 | 14.87 | 13.20 |
| Turbidity | NTU | 0.31 | 2.15 | 2.97 | 7.83 | 7.83 | 0.71 | 0.92 |

Notes:

^{a)}Cleanup criteria identified by MDEQ Op Memo No. 1 updated 9/28/12, pursuant to 1994 PA-451 as amended

U - Not present at or above the associated value.

J - Laboratory qualifier - estimated concentration.

UJ - Estimated reporting limit.

R - Rejected.

TABLE 2

SUMMARY OF OCTOBER 2012 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

| <i>Sample Location</i> | <i>MW-108S</i> | <i>MW-109D</i> |
|--|----------------------------|------------------------------|
| <i>Sample Identification</i> | GW-56393-102212-JV-098 | GW-56393-102312-JV-111 |
| <i>Sample Date</i> | 10/22/2012 | 10/23/2012 |
| <i>Sample Type</i> | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (2-9)</i> | <i>Screen_Depth: (22-27)</i> |
| <i>Sample Elevation (feet AMSL)</i> | 701.32-692.32 | 689.41-666.41 |
| | <i>Units</i> | |
| <i>Volatile Organic Compounds (VOCs)</i> | | |
| Acetone | ug/L | 20 U |
| Benzene | ug/L | 0.50 U |
| Bromodichloromethane | ug/L | 0.50 U |
| Bromoform | ug/L | 0.50 U |
| Bromomethane (Methyl bromide) | ug/L | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | ug/L | R |
| Carbon disulfide | ug/L | 0.50 U |
| Carbon tetrachloride | ug/L | 0.50 U |
| Chlorobenzene | ug/L | 0.50 U |
| Chloroethane | ug/L | 0.50 U |
| Chloroform (Trichloromethane) | ug/L | 0.50 U |
| Chloromethane (Methyl chloride) | ug/L | 0.50 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | ug/L | 2.0 U |
| Dibromochloromethane | ug/L | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | ug/L | 2.0 U |
| 1,2-Dichlorobenzene | ug/L | 0.50 U |
| 1,3-Dichlorobenzene | ug/L | 0.50 U |
| 1,4-Dichlorobenzene | ug/L | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | ug/L | 0.50 U |
| 1,1-Dichloroethane | ug/L | 0.50 U |
| 1,2-Dichloroethane | ug/L | 0.50 U |
| 1,1-Dichloroethene | ug/L | 0.50 U |
| cis-1,2-Dichloroethene | ug/L | 0.50 U |
| trans-1,2-Dichloroethene | ug/L | 0.50 U |
| 1,2-Dichloropropene | ug/L | 0.50 U |
| cis-1,3-Dichloropropene | ug/L | 0.50 U |
| trans-1,3-Dichloropropene | ug/L | 0.50 U |
| Ethylbenzene | ug/L | 0.50 U |
| 2-Hexanone | ug/L | 20 U |
| Isopropyl benzene | ug/L | 2.0 U |
| Methyl tert butyl ether (MTBE) | ug/L | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | ug/L | 20 U |
| Methylene chloride | ug/L | 2.0 U |
| Sterene | ug/L | 0.50 U |
| 1,1,2,2-Tetrachloroethane | ug/L | 0.50 U |
| Tetrachloroethene | ug/L | 0.50 U |
| Toluene | ug/L | 0.50 U |
| 1,2,4-Trichlorobenzene | ug/L | 2.0 U |
| 1,1,1-Trichloroethane | ug/L | 0.50 U |
| 1,1,2-Trichloroethane | ug/L | 0.50 U |
| Trichloroethene | ug/L | 0.50 U |
| Trichlorofluoromethane (CFC-11) | ug/L | 0.50 U |
| Vinyl chloride | ug/L | 0.50 U |
| o-Xylene | ug/L | 0.50 U |
| m&p-Xylenes | ug/L | 0.50 U |

TABLE 2

SUMMARY OF OCTOBER 2012 GROUNDWATER ANALYTICAL RESULTS
 12th STREET LANDFILL
 OTSEGO TOWNSHIP, MICHIGAN

| <i>Sample Location</i> | <i>MW-108S</i> | <i>MW-109D</i> |
|-------------------------------------|-------------------------------|-------------------------------|
| <i>Sample Identification</i> | <i>GW-56393-102212-JV-098</i> | <i>GW-56393-102312-JV-111</i> |
| <i>Sample Date</i> | <i>10/22/2012</i> | <i>10/23/2012</i> |
| <i>Sample Type</i> | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (2-9)</i> | <i>Screen_Depth: (22-27)</i> |
| <i>Sample Elevation (feet AMSL)</i> | <i>701.32-692.32</i> | <i>689.41-666.41</i> |
| <i>Units</i> | | |
| Metals | | |
| Cyanide (amenable) | ug/L | 10 U |
| Cyanide (total) | ug/L | 10 U |
| Magnesium | ug/L | 25000 |
| Mercury | ug/L | 0.001 U |
| Sodium | ug/L | 22300 |
| PCBs | | |
| Aroclor-1016 (PCB-1016) | ug/L | 0.020 U |
| Aroclor-1221 (PCB-1221) | ug/L | 0.040 U |
| Aroclor-1232 (PCB-1232) | ug/L | 0.020 U |
| Aroclor-1242 (PCB-1242) | ug/L | 0.020 U |
| Aroclor-1248 (PCB-1248) | ug/L | 0.020 U |
| Aroclor-1254 (PCB-1254) | ug/L | 0.020 U |
| Aroclor-1260 (PCB-1260) | ug/L | 0.020 U |
| Total PCBs | ug/L | ND |
| Field Parameters | | |
| Conductivity | mS/cm | 0.889 |
| Dissolved oxygen (DO) | mg/L | 1.81 |
| Oxidation reduction potential (ORP) | millivolts | 123 |
| pH | s.u. | 6.85 |
| Temperature | Deg C | 13.08 |
| Turbidity | NTU | 0.51 |

Notes:

① Cleanup criteria identified by MDEQ Op Memo No. 1

updated 9/28/12, pursuant to 1994 PA 451 as amended

U - Not present at or above the associated value.

J - Laboratory qualifier - estimated concentration.

UL - Estimated reporting limit.

R - Rejected.



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MEMORANDUM

TO: Greg Carli REF. NO.: 56393
FROM: Susan Scrocchi/eew-17 DATE: December 10, 2012
cc: Jodie Dembowske REVISION: January 4, 2013
RE: Data Quality Assessment and Full Validation
Groundwater Monitoring – October 2012
12th Street Landfill, Otsego Township, Michigan

The following details a quality assessment and validation of the analytical data resulting from the October 2012, collection of water samples from the 12th Street Landfill Site in Otsego Township, Michigan. The sample summary detailing sample identification, sample location, quality control samples, and analytical parameters is presented in Table 1. Sample analysis was completed at Columbia Analytical Services in Kelso, Washington (CAS) in accordance with the methodologies presented in Table 2. The validated analytical results are summarized in Table 3.

The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP). Application of quality assurance criteria was consistent with following guidance documents:

- i. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA-540/R-99/008, October 1999
- ii. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA-540/R-94/013, February 1994

These guidelines are collectively referred to as "NFGs" in this Memorandum.

Sample Quantitation

The laboratory reported detected concentrations of organic and inorganic compounds below the laboratory's report limit (RL) but above the laboratory's method detection limit (MDL). The laboratory flagged these sample concentrations with a "J". These concentrations should be qualified as estimated (J) values unless qualified otherwise in this memorandum.

Sample Preservation and Holding Times

Sample holding time periods and preservation requirements are presented in Table 2.

All samples were prepared and/or analyzed within the specified holding time periods. The samples were shipped and maintained in accordance with the sample preservation requirements.

Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration (Instrument Performance Check) – Organic Analyses

To ensure adequate mass resolution, identification, and to some degree, sensitivity; the performance of each GC/MS instrument used for volatile organic compound (VOC) analysis was checked at the beginning of each 12-hour period. The resulting spectra must meet the criteria cited in the NFGs before initiating an analysis sequence.

Instrument performance check data were reviewed. These tuning compounds were analyzed at the required frequency throughout the VOC analysis. The results of all instrument performance checks were within the acceptance criteria, indicating acceptable instrument performance.

Initial Calibration – Organic Analyses

Initial calibration data are used to demonstrate that each instrument is capable of generating acceptable quantitative data. A five point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each over a specific concentration range.

Initial calibration criteria for organic analyses are evaluated against the following criteria:

- i. GC/MS (all compounds) – must meet a minimum mean relative response factor (RRF) of 0.05.
- ii. GC/MS (all compounds) – the percent relative standard deviation (RSD) values must not exceed 30.0 percent or a minimum coefficient of determination of 0.99 if quadratic equation calibration curves are used.
- iii. GC (all compounds using an average for multi-response compounds) – the percent RSD must not exceed 20 percent or a correlation coefficient of 0.995 when linear regression calibration curves are used.

Calibration standards were analyzed at the required frequency and the results met the above criteria for linearity and sensitivity with the exception of the qualified samples presented in Table 4.

Continuing Calibration – Organic Analyses

To ensure that each instrument was capable of producing acceptable quantitative data over the analysis period, continuing calibration standards must be analyzed every 12 hours for GC/MS analyses. The following criteria are employed to evaluate the continuing calibration data:

- i. GC/MS (all compounds) – must meet a minimum mean RRF of 0.05.
- ii. GC/MS (all compounds) – the percent difference between the mean initial calibration RRF and the continuing calibration RRF must not exceed 25 percent.
- iii. GC/MS (compounds determined by quadratic curve) – the percent drift between the true value and the continuing calibration value must not exceed 25 percent.
- iv. GC (all compounds using average for multi-response compounds) – the percent difference between mean initial calibration factor and the continuing calibration factor must not exceed 15 percent.

- v. GC (compounds determined by linear regression) - the percent drift between the true value and the continuing calibration value must not exceed 15 percent.

Calibration standards were analyzed at the required frequency and the results met the above criteria for instrument sensitivity and linearity of response and sensitivity with the exception of the qualified samples presented in Table 5.

Inductively Coupled Plasma/Mass Spectrometer (ICP/MS) –
Mass Calibration and Resolution Checks – Metal Analyses

To ensure adequate mass resolution, identification, and to some degree, sensitivity; the performance of each ICP/MS instrument used for metals analyses was checked prior to calibration before initiating an analysis sequence through the analysis of a tuning solution. The results of the tuning solution analysis were reviewed against the following criteria:

- i. Analyze tuning solution a minimum of four times with a percent RSD of less than or equal to five for the analytes contained in the tuning solution
- ii. The mass resolution must be within 0.1 amu of the true value over the analytical range

Instrument performance check data were reviewed. The tuning solution was analyzed at the required frequency throughout the analyses. The results of all instrument performance checks were within the acceptance criteria, indicating acceptable instrument performance.

Initial Calibration – Inorganic Analyses

Initial calibration of the instruments ensures that they are capable of producing satisfactory quantitative data at the beginning of a series of analyses. For ICP analysis, a calibration blank and at least one standard must be analyzed at each wavelength to establish the analytical curve. For instrumental wet chemistry analysis, a calibration blank and a minimum of four standards must be analyzed to establish the analytical curve. Resulting correlation coefficients for curves consisting of a blank and four or more standards must be at least 0.995.

For low level mercury analyses, three blanks and a minimum of five standards are analyzed. The average blank response is used to correct each standard response, and the corrected responses are used to calculate calibration factors. The calibration is acceptable if the RSD of the calibration factors is less than 15 percent and if recovery of the lowest standard is 75 to 125 percent.

Initial calibration is verified with an initial calibration verification (ICV) standard which must recover within 90 to 110 percent for metals by ICP, 77 to 123 percent for mercury by Atomic Fluorescence and 85 to 115 percent for general chemistry parameters.

A review of the laboratory data showed that the inorganic initial calibration curves and ICVs were analyzed at the appropriate frequency and were within the acceptance criteria.

Continuing Calibration – Inorganic Analyses

Continuing calibration verification (CCV) standards are analyzed at method specified frequency (one every 10 samples). The CCVs must meet the percent recovery control limits specified above for the ICVs. Criteria for inorganic analyses are the same criteria as used for assessing the initial calibration data.

A review of the laboratory data showed that CCVs were analyzed at the appropriate frequency and the data were within the acceptance criteria.

Method Blank Samples

Method blank samples are prepared from a purified sample matrix and are processed concurrently with investigative samples to assess the presence and the magnitude of sample contamination introduced during sample analysis. Method blank samples are analyzed at a minimum frequency of one per analytical batch and target analytes should be non-detect.

Some VOCs and metals were detected in the method blanks at low concentrations. All associated samples with similar results were qualified as non-detect (see Table 6). Where concentrations were either non-detect or significantly greater than the blanks, the data would not have been impacted.

Laboratory Blank Samples - Inorganic Analyses

Metals analyses include the analysis of initial calibration blanks (ICB) and continuing calibration blanks (CCB) to assess the presence and the magnitude of sample contamination introduced during sample analysis. The CCBs are analyzed at a minimum frequency of one every 10 samples and target analytes should be non-detect.

Some ICB and CCBs were reported with detectable concentrations of target analytes. The associated sample results were significantly greater than the blanks and would not have been impacted.

Surrogate Compounds - Organic Analyses

Individual sample performance for organic analyses was monitored by assessing the results of surrogate compound percent recoveries. Surrogate percent recoveries are reviewed against the laboratory developed control limits provided in the analytical report.

The surrogate recovery acceptance criteria were met for all samples that could be evaluated.

Matrix Spike/Matrix Spike Duplicate Analyses

To assess the long term accuracy and precision of the analytical methods on various matrices, matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and the relative percent difference (RPD) of the concentrations were determined. The organic MS/MSD percent recovery and RPD control limits are established by the laboratory. The inorganic control limits are defined by the methods or the laboratory and the NFG. The samples selected for MS/MSD analysis are identified in Table 1.

The MS/MSD percent recoveries and associated RPD acceptance criteria were met.

Laboratory Control Sample/Laboratory Control Duplicate Analyses

The laboratory control sample (LCS) and/or laboratory control duplicate (LCD) analyses serve as a monitor of the overall performance in all steps of the sample analysis and are analyzed with each sample batch. The LCS/LCD percent recoveries were evaluated against method and laboratory established control limits.

The LCS/LCD percent recoveries were within the laboratory control limits or did not warrant qualification, indicating that an acceptable level of overall performance was achieved.

Laboratory precision was verified by the relative percent difference (RPD) of the LCS/LCD when a matrix spike/matrix duplicate was not analyzed.

The RPDs were within the laboratory control limits, indicating that an acceptable level of overall laboratory precision was achieved.

Inductively Coupled Plasma (ICP) Interference Check Sample Analysis – Inorganic Analyses

To verify that proper inter-element and background correction factors had been established by the laboratory for metals analyses, the ICP interference check samples (ICS) are analyzed. The ICSs are evaluated against recovery control limits of 80 to 120 percent.

The ICS analysis results were evaluated for all samples and were within the control limits.

Internal Standard Summaries – Organic Analyses

To correct for variability in the GC/MS response and sensitivity, internal standard (IS) compounds are added to all samples. All results are calculated as a ratio of the compound and associated IS response. Overall instrument stability and performance for VOC analysis was monitored using IS peak area and retention time (RT) data. The IS peak areas and RTs of the samples are required to meet the following criteria:

- i. IS area counts must not vary by more than a factor of two (-50 percent to +100 percent) from the associated continuing calibration standard IS area counts
- ii. The RT of the IS must not vary by more than plus or minus 30 seconds from the associated continuing calibration standard

A review of the VOC internal standard data showed that the IS area counts and retention time data were within the acceptance criteria.

Internal Standard Summaries – Inorganic Analyses

To correct for variability in the ICP/MS response and sensitivity, internal standards (IS) are added to all samples. All results are calculated as a ratio of the IS response to the response of the sample.

Internal Standard Summaries – Inorganic Analyses (continued)

Overall instrument stability and performance for metals analyses was monitored using the IS intensity data which are evaluated against the following criteria:

- i. The IS intensities in samples must recover between 30 and 120 percent of the true value
- ii. The IS intensities in instrument calibration checks (CCVs and CCBs) must recover between 60 and 125 percent of the true value

A review of the ICP/MS metals IS data showed that the IS intensities were within the acceptance criteria.

Serial Dilution – Inorganic Analyses

The percent difference (D) between a serial dilution of a sample for each matrix was monitored to determine physical or chemical interference. A minimum of one sample per 20 investigative samples is analyzed at a five-fold dilution. The serial dilution results must agree within 10 percent D of the original results for samples with detected concentrations greater than 50 times the instrument detection limit.

The percent D acceptance criteria was met.

Duplicate Sample Analyses – Inorganic Analyses

The laboratory precision of matrix-specific metals methods was monitored by the analyses of duplicate samples.

The duplicate RPDs were within the acceptance criteria.

Post Digestion Spike Analyses – Inorganic Analyses

At least one spiked (pre-digestion) sample is prepared and analyzed for each analytical batch of metals. When the pre-digestion spike recovery falls outside of the control limits and the sample result is greater than four times the spike added, a post digestion spike is performed for those analytes that do not meet the specified criteria.

The post digestion spike results were evaluated and were within the control limits.

Contract Required Detection Limit (CRDL) Analyses – Inorganic Analyses

The instrument calibration near the Contract Required Detection Limit (CRDL) must be verified for each analyte reported. An ICP standard solution at the CRDL (CRI) is evaluated against the control limits provided.

The CRI analysis results were evaluated for all samples and were within the control limits.

Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra (if applicable) were evaluated according to identification criteria established by the methods. The samples identified in Table 1 were reviewed. The organic compounds reported adhered to the specified identification criteria.

The reported quantitation results and detection limits were checked to ensure results reported were accurate. The samples identified in Table 1 were reviewed. No discrepancies were found between the raw data and the sample results reported by the laboratory.

Field Quality Assurance/Quality Control

The field quality assurance/quality control consisted of one (1) field blank (rinsate) sample, two (2) trip blank samples and one (1) field duplicate sample.

Field Blank Samples

To assess the efficiency of field decontamination procedures and cleanliness of sample containers, the rinsate sample identified in Table 1 was collected and analyzed.

The samples that should be qualified due to rinsate blank contamination are summarized in Table 7. No additional targeted analytes were reported as detected in the rinsate samples.

Trip Blank Samples

To monitor potential cross-contamination of VOC during sample transportation and storage, a trip blank was submitted to the laboratory for VOC analysis with each shipping cooler containing multiple samples.

Some VOCs and mercury were detected in the trip blank. Samples requiring qualification were previously qualified due to method and/or rinse blank.

Field Duplicate Samples

Overall precision for the sampling event and laboratory procedures was monitored using the results of the field duplicate sample set. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the RL, the evaluation criteria is one times the RL value for water samples.

The data indicate that an adequate level of precision was achieved for the sampling event.

System Performance

System performance between various quality control checks was evaluated to monitor for changes that may have caused the degradation of data quality. No technical problems or chromatographic anomalies were observed which would require qualification of the data.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information, and may be used with the qualifications noted with the exception of the following:

- 2-Butanone was rejected in a number of samples due to initial and continuing calibration violations.

TABLE 1

**SAMPLE COLLECTION AND ANALYSIS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Identification</i> | <i>Location</i> | <i>Matrix</i> | <i>QC Samples</i> | <i>Collection Date (mm/dd/yyyy)</i> | <i>Collection Time (hr:min)</i> | <i>Analysis/Parameter</i> | | | | | | |
|------------------------------------|-----------------|---------------|-----------------------------|---|-------------------------------------|---------------------------|---------|------------------|------------|--------------------|-----------------|--|
| | | | | | | TCL VOC | TCL PCB | Sodium/Magnesium | LL Mercury | Cyanide (amenable) | Cyanide (total) | |
| CAS Work Order No. K1210729 | | | | | | | | | | | | |
| GW-56393-102212-JV-098 | MW-108S | water | | 10/22/2012 | 10:10 | X | X | X | X | X | X | |
| GW-56393-102212-JV-099 | MW-108D | water | | 10/22/2012 | 10:17 | X | X | X | X | X | X | |
| GW-56393-102212-JV-100 | MW-107S | water | | 10/22/2012 | 10:02 | X | X | X | X | X | X | |
| GW-56393-102212-JV-101 | MW-106S | water | | 10/22/2012 | 11:30 | X | X | X | X | X | X | |
| GW-56393-102212-JV-102 | MW-106D | water | | 10/22/2012 | 11:20 | X | X | X | X | X | X | |
| GW-56393-102212-JV-103 | MW-106D | water | DUP(GW-56393-102212-JV-102) | 10/22/2012 | 11:35 | X | X | X | X | X | X | |
| GW-56393-102212-JV-104 | MW-105S | water | | 10/22/2012 | 12:22 | X | X | X | X | X | X | |
| GW-56393-102212-JV-105 | MW-105D | water | | 10/22/2012 | 13:05 | X | X | X | X | X | X | |
| GW-56393-102212-JV-106 | MW-104S | water | | 10/22/2012 | 14:10 | X | X | X | X | X | X | |
| GW-56393-102212-JV-107 | MW-104D | water | | 10/22/2012 | 14:15 | X | X | X | X | X | X | |
| GW-56393-102312-JV-108 | MW-103D | water | | 10/23/2012 | 8:58 | X | X | X | X | X | X | |
| GW-56393-102312-JV-109 | MW-102S | water | MS/MSD | 10/23/2012 | 9:52 | X | X | X | X | X | X | |
| GW-56393-102312-JV-110 | MW-102D | water | | 10/23/2012 | 9:52 | X | X | X | X | X | X | |
| GW-56393-102312-JV-111 | MW-109D | water | | 10/23/2012 | 12:05 | X | X | X | X | X | X | |
| GW-56393-102312-JV-112 | MW-101S | water | | 10/23/2012 | 12:35 | X | X | X | X | X | X | |
| GW-56393-102312-JV-113 | MW-101D | water | | 10/23/2012 | 13:38 | X | X | X | X | X | X | |
| EB-56393-102312-JV-114 | - | water | Equipment Blank | 10/23/2012 | 14:20 | X | X | X | X | X | X | |
| TB-56393-102312-JV-115 | - | water | | 10/23/2012 | - | | | | | X | X | |
| TB-56393-102312-JV-116 | - | water | | 10/23/2012 | - | | | | | X | X | |

Notes:

DUP - Field Duplicate of sample indicated in parentheses

LL - Low Level

MS/MSD - Matrix Spike/Matrix Spike Duplicate

PCB - Polychlorinated biphenyls

QC - Quality Control

TCL - Target Compound List

VOC - Volatile Organic Compounds

TABLE 2

**SUMMARY OF ANALYTICAL METHODS, HOLDING TIME PERIODS, AND PRESERVATIVES
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| Parameter | Method¹ | Matrix | Holding Time | Preservation |
|--------------------------|---------------------------|---------------|--|----------------------------|
| TCL VOC | SW-846 8260 | Water | - 14 days from sample collection to completion of analysis. | pH < 2 and Iced, 4 ± 2° C |
| PCB | SW-846 8082 | Water | - 7 days from sample collection to extraction - 40 days from extraction to completion of analysis | Iced, 4 ± 2° C |
| TAL Metals | | Water | - 180 days from sample collection to completion of analysis | pH < 2 and Iced, 4 ± 2° C |
| Magnesium | EPA-WW 200.7 | | | |
| Sodium | EPA-WW 200.7 | | | |
| LL-Mercury | EPA 1631 | Water | - 28 days from sample collection to completion of analysis | pH < 2 and Iced, 4 ± 2° C |
| General Chemistry | | | | |
| Cyanide (Amenable) | SM4500-CN-E | Water | - 14 days from sample collection to analysis | pH > 12 and Iced, 4 ± 2° C |
| Cyanide (Total) | SW-846 9012 | Water | - 14 days from sample collection to analysis | pH > 12 and Iced, 4 ± 2° C |

Notes**¹ Method References:**

EPA 1631 , Revision E "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry" USEPA Office of Water (EPA-821-R-02-019) August 2002.
 SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, and Promulgated updates, November 1986

TAL - Target Analyte List

TCL - Target Compound List

LL - Low Level

VOC - Volatile Organic Compounds

PCB - Polychlorinated biphenyls

SVOC - Semivolatile Organic Compounds

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-101D</i> | <i>MW-101S</i> | <i>MW-102D</i> | <i>MW-102S</i> |
|--|------------------------------|------------------------------|------------------------------|-----------------------------|
| <i>Sample Identification</i> | GW-56393-102312-JV-113 | GW-56393-102312-JV-112 | GW-56393-102312-JV-110 | GW-56393-102312-JV-109 |
| <i>Sample Date</i> | 10/23/2012 | 10/23/2012 | 10/23/2012 | 10/23/2012 |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth:</i> (70-75) | <i>Screen_Depth:</i> (32-29) | <i>Screen_Depth:</i> (40-45) | <i>Screen_Depth:</i> (3-10) |
| <i>Sample Elevation (feet AMSL)</i> | 664.33-589.33 | 702.35-663.35 | 664.43-619.43 | 701.18-691.18 |
| <i>Parameters</i> | <i>Units</i> | | | |
| Volatile Organic Compounds (VOCs) | | | | |
| Acetone | µg/L | 20 U | 20 U | 20 U |
| Benzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromodichloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromoform | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromomethane (Methyl bromide) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | µg/L | R | R | R |
| Carbon disulfide | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Carbon tetrachloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroform (Trichloromethane) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloromethane (Methyl chloride) | µg/L | 0.50 UJ | 0.50 UJ | 0.50 UJ |
| 1,2-Dibromo-3-chloropropane (DBCP) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Dibromochloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,2-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,3-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,4-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | µg/L | 0.50 UJ | 0.50 UJ | 0.50 UJ |
| 1,1-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| trans-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloropropane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-101D</i> | <i>MW-101S</i> | <i>MW-102D</i> | <i>MW-102S</i> |
|--|------------------------------|------------------------------|------------------------------|-----------------------------|
| <i>Sample Identification</i> | GW-56393-102312-JV-113 | GW-56393-102312-JV-112 | GW-56393-102312-JV-110 | GW-56393-102312-JV-109 |
| <i>Sample Date</i> | 10/23/2012 | 10/23/2012 | 10/23/2012 | 10/23/2012 |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (70-75)</i> | <i>Screen_Depth: (32-29)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (3-10)</i> |
| <i>Sample Elevation (feet AMSL)</i> | 664.33-589.33 | 702.35-663.35 | 664.43-619.43 | 701.18-691.18 |
| <i>Parameters</i> | <i>Units</i> | | | |
| Volatile Organic Compounds (VOCs), continued | | | | |
| trans-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Ethylbenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Hexanone | µg/L | 20 U | 20 U | 20 U |
| Isopropyl benzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Methyl tert butyl ether (MTBE) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | µg/L | 20 U | 20 U | 20 U |
| Methylene chloride | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Styrene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2,2-Tetrachloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Tetrachloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Toluene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2,4-Trichlorobenzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,1,1-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichlorofluoromethane (CFC-11) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Vinyl chloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| o-Xylene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| m&p-Xylenes | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Metals | | | | |
| Cyanide (amenable) | µg/L | 10 U | 10 U | 10 U |
| Cyanide (total) | µg/L | 10 U | 10 U | 10 U |
| Magnesium | µg/L | 23300 | 24100 | 23200 |
| Mercury | µg/L | 0.001 U | 0.001 U | 0.001 U |
| Sodium | µg/L | 23800 | 23700 | 20400 |
| | | | | 22000 |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-101D</i> | <i>MW-101S</i> | <i>MW-102D</i> | <i>MW-102S</i> |
|-------------------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|
| <i>Sample Identification</i> | GW-56393-102312-JV-113 | GW-56393-102312-JV-112 | GW-56393-102312-JV-110 | GW-56393-102312-JV-109 |
| <i>Sample Date</i> | 10/23/2012 | 10/23/2012 | 10/23/2012 | 10/23/2012 |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth:</i> (70-75) | <i>Screen_Depth:</i> (32-29) | <i>Screen_Depth:</i> (40-45) | <i>Screen_Depth:</i> (3-10) |
| <i>Sample Elevation (feet AMSL)</i> | 664.33-589.33 | 702.35-663.35 | 664.43-619.43 | 701.18-691.18 |
| <i>Parameters</i> | <i>Units</i> | | | |
| PCBs | | | | |
| Aroclor-1016 (PCB-1016) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1221 (PCB-1221) | µg/L | 0.040 U | 0.040 U | 0.040 U |
| Aroclor-1232 (PCB-1232) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1242 (PCB-1242) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1248 (PCB-1248) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1254 (PCB-1254) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1260 (PCB-1260) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Total PCBs | µg/L | ND | ND | ND |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-103D</i> | <i>MW-104D</i> | <i>MW-104S</i> | <i>MW-105D</i> |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <i>Sample Identification</i> | <i>GW-56393-102312-JV-108</i> | <i>GW-56393-102212-JV-107</i> | <i>GW-56393-102212-JV-106</i> | <i>GW-56393-102212-JV-105</i> |
| <i>Sample Date</i> | <i>10/23/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (30-35)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (20-25)</i> | <i>Screen_Depth: (42-47)</i> |
| <i>Sample Elevation (feet AMSL)</i> | <i>674.37-639.37</i> | <i>633.48-618.48</i> | <i>684.86-658.86</i> | <i>662.79-615.79</i> |
| <i>Parameters</i> | <i>Units</i> | | | |
| Volatile Organic Compounds (VOCs) | | | | |
| Acetone | µg/L | 20 U | 20 U | 20 U |
| Benzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromodichloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromoform | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromomethane (Methyl bromide) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | µg/L | R | R | R |
| Carbon disulfide | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Carbon tetrachloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroform (Trichloromethane) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloromethane (Methyl chloride) | µg/L | 0.50 UJ | 0.50 UJ | 0.50 UJ |
| 1,2-Dibromo-3-chloropropane (DBCP) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Dibromochloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,2-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,3-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,4-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | µg/L | 0.50 UJ | 0.50 UJ | 0.50 UJ |
| 1,1-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| trans-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloropropane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-103D</i> | <i>MW-104D</i> | <i>MW-104S</i> | <i>MW-105D</i> |
|--|------------------------------|------------------------------|------------------------------|------------------------------|
| <i>Sample Identification</i> | GW-56393-102312-JV-108 | GW-56393-102212-JV-107 | GW-56393-102212-JV-106 | GW-56393-102212-JV-105 |
| <i>Sample Date</i> | 10/23/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen Depth:</i> (30-35) | <i>Screen Depth:</i> (40-45) | <i>Screen Depth:</i> (20-25) | <i>Screen Depth:</i> (42-47) |
| <i>Sample Elevation (feet AMSL)</i> | 674.37-639.37 | 633.48-618.48 | 684.86-658.86 | 662.79-615.79 |
| <i>Parameters</i> | <i>Units</i> | | | |
| Volatile Organic Compounds (VOCs), continued | | | | |
| trans-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Ethylbenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Hexanone | µg/L | 20 U | 20 U | 20 U |
| Isopropyl benzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Methyl tert butyl ether (MTBE) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | µg/L | 20 U | 20 U | 20 U |
| Methylene chloride | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Styrene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2,2-Tetrachloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Tetrachloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Toluene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2,4-Trichlorobenzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,1,1-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichlorofluoromethane (CFC-11) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Vinyl chloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| o-Xylene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| m&p-Xylenes | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Metals | | | | |
| Cyanide (amenable) | µg/L | 10 U | 10 U | 10 U |
| Cyanide (total) | µg/L | 10 U | 10 U | 10 U |
| Magnesium | µg/L | 22100 | 23200 | 23100 |
| Mercury | µg/L | 0.001 U | 0.001 U | 0.001 U |
| Sodium | µg/L | 18800 | 21600 | 20900 |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-103D</i> | <i>MW-104D</i> | <i>MW-104S</i> | <i>MW-105D</i> |
|-------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <i>Sample Identification</i> | <i>GW-56393-102312-JV-108</i> | <i>GW-56393-102212-JV-107</i> | <i>GW-56393-102212-JV-106</i> | <i>GW-56393-102212-JV-105</i> |
| <i>Sample Date</i> | <i>10/23/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (30-35)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (20-25)</i> | <i>Screen_Depth: (42-47)</i> |
| <i>Sample Elevation (feet AMSL)</i> | <i>674.37-639.37</i> | <i>633.48-618.48</i> | <i>684.86-658.86</i> | <i>662.79-615.79</i> |
| <i>Parameters</i> | <i>Units</i> | | | |
| <i>PCBs</i> | | | | |
| Aroclor-1016 (PCB-1016) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1221 (PCB-1221) | µg/L | 0.040 U | 0.040 U | 0.040 U |
| Aroclor-1232 (PCB-1232) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1242 (PCB-1242) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1248 (PCB-1248) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1254 (PCB-1254) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1260 (PCB-1260) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Total PCBs | µg/L | ND | ND | ND |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-105S</i> | <i>MW-106D</i> | <i>MW-106D</i> | <i>MW-106S</i> |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <i>Sample Identification</i> | <i>GW-56393-102212-JV-104</i> | <i>GW-56393-102212-JV-102</i> | <i>GW-56393-102212-JV-103</i> | <i>GW-56393-102212-JV-101</i> |
| <i>Sample Date</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> |
| <i>Sample Type</i> | | | <i>Duplicate</i> | |
| <i>Screen Depth</i> | <i>Screen_Depth: (5-12)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (2-9)</i> |
| <i>Sample Elevation (feet AMSL)</i> | <i>699.89-687.89</i> | <i>664.66-620.66</i> | <i>664.66-620.66</i> | <i>701.89-692.89</i> |
| <i>Parameters</i> | <i>Units</i> | | | |
| Volatile Organic Compounds (VOCs) | | | | |
| Acetone | µg/L | 20 U | 20 U | 20 U |
| Benzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromodichloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromoform | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromomethane (Methyl bromide) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | µg/L | R | R | R |
| Carbon disulfide | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Carbon tetrachloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroform (Trichloromethane) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloromethane (Methyl chloride) | µg/L | 0.50 UJ | 0.50 UJ | 0.50 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Dibromochloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,2-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,3-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,4-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | µg/L | 0.50 UJ | 0.50 UJ | 0.50 U |
| 1,1-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| trans-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloropropane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-105S</i> | <i>MW-106D</i> | <i>MW-106D</i> | <i>MW-106S</i> |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <i>Sample Identification</i> | <i>GW-56393-102212-JV-104</i> | <i>GW-56393-102212-JV-102</i> | <i>GW-56393-102212-JV-103</i> | <i>GW-56393-102212-JV-101</i> |
| <i>Sample Date</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> |
| <i>Sample Type</i> | | | <i>Duplicate</i> | |
| <i>Screen Depth</i> | <i>Screen_Depth: (5-12)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (2-9)</i> |
| <i>Sample Elevation (feet AMSL)</i> | <i>699.89-687.89</i> | <i>664.66-620.66</i> | <i>664.66-620.66</i> | <i>701.89-692.89</i> |
| <i>Parameters</i> | <i>Units</i> | | | |
| <i>Volatile Organic Compounds (VOCs), continued</i> | | | | |
| trans-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Ethylbenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Hexanone | µg/L | 20 U | 20 U | 20 U |
| Isopropyl benzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Methyl tert butyl ether (MTBE) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | µg/L | 20 U | 20 U | 20 U |
| Methylene chloride | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Styrene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2,2-Tetrachloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Tetrachloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Toluene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2,4-Trichlorobenzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,1,1-Trichloroethane | µg/L | 0.13 J | 0.50 U | 0.50 U |
| 1,1,2-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichlorofluoromethane (CFC-11) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Vinyl chloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| o-Xylene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| m&p-Xylenes | µg/L | 0.50 U | 0.50 U | 0.50 U |
| <i>Metals</i> | | | | |
| Cyanide (amenable) | µg/L | 10 U | 10 U | 10 U |
| Cyanide (total) | µg/L | 10 U | 10 U | 10 U |
| Magnesium | µg/L | 27700 | 23500 | 23200 |
| Mercury | µg/L | 0.001 U | 0.001 U | 0.001 U |
| Sodium | µg/L | 23800 | 22400 | 22200 |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-105S</i> | <i>MW-106D</i> | <i>MW-106D</i> | <i>MW-106S</i> |
|-------------------------------------|-----------------------------|------------------------------|------------------------------|----------------------------|
| <i>Sample Identification</i> | GW-56393-102212-JV-104 | GW-56393-102212-JV-102 | GW-56393-102212-JV-103 | GW-56393-102212-JV-101 |
| <i>Sample Date</i> | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/22/2012 |
| <i>Sample Type</i> | | | <i>Duplicate</i> | |
| <i>Screen Depth</i> | <i>Screen_Depth: (5-12)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (2-9)</i> |
| <i>Sample Elevation (feet AMSL)</i> | 699.89-687.89 | 664.66-620.66 | 664.66-620.66 | 701.89-692.89 |
| <i>Parameters</i> | <i>Units</i> | | | |
| PCBs | | | | |
| Aroclor-1016 (PCB-1016) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1221 (PCB-1221) | µg/L | 0.039 U | 0.040 U | 0.040 U |
| Aroclor-1232 (PCB-1232) | µg/L | 0.020 U | 0.020 U | 0.026 U |
| Aroclor-1242 (PCB-1242) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1248 (PCB-1248) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1254 (PCB-1254) | µg/L | 0.020 U | 0.0074 J | 0.0057 J |
| Aroclor-1260 (PCB-1260) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Total PCBs | µg/L | ND | 0.0074 J | 0.0057 J |
| | | | | ND |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-107S</i> | <i>MW-108D</i> | <i>MW-108S</i> | <i>MW-109D</i> |
|--|-----------------------------|------------------------------|----------------------------|------------------------------|
| <i>Sample Identification</i> | GW-56393-102212-JV-100 | GW-56393-102212-JV-099 | GW-56393-102212-JV-098 | GW-56393-102312-JV-111 |
| <i>Sample Date</i> | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/23/2012 |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth:</i> (8-13) | <i>Screen_Depth:</i> (40-45) | <i>Screen_Depth:</i> (2-9) | <i>Screen_Depth:</i> (22-27) |
| <i>Sample Elevation (feet AMSL)</i> | 695.76-682.76 | 663.39-618.39 | 701.32-692.32 | 689.41-666.41 |
| <i>Parameters</i> | <i>Units</i> | | | |
| Volatile Organic Compounds (VOCs) | | | | |
| Acetone | µg/L | 20 U | 20 U | 20 U |
| Benzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromodichloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromoform | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Bromomethane (Methyl bromide) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Butanone (Methyl ethyl ketone) (MEK) | µg/L | R | R | R |
| Carbon disulfide | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Carbon tetrachloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloroform (Trichloromethane) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Chloromethane (Methyl chloride) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromo-3-chloropropane (DBCP) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Dibromochloromethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dibromoethane (Ethylene dibromide) | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,2-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,3-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,4-Dichlorobenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Dichlorodifluoromethane (CFC-12) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1-Dichloroethane | µg/L | 0.50 U | 0.14 J | 0.50 U |
| 1,2-Dichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| trans-1,2-Dichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2-Dichloropropane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| cis-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-107S</i> | <i>MW-108D</i> | <i>MW-108S</i> | <i>MW-109D</i> |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <i>Sample Identification</i> | <i>GW-56393-102212-JV-100</i> | <i>GW-56393-102212-JV-099</i> | <i>GW-56393-102212-JV-098</i> | <i>GW-56393-102312-JV-111</i> |
| <i>Sample Date</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/22/2012</i> | <i>10/23/2012</i> |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth: (8-13)</i> | <i>Screen_Depth: (40-45)</i> | <i>Screen_Depth: (2-9)</i> | <i>Screen_Depth: (22-27)</i> |
| <i>Sample Elevation (feet AMSL)</i> | <i>695.76-682.76</i> | <i>663.39-618.39</i> | <i>701.32-692.32</i> | <i>689.41-666.41</i> |
| <i>Parameters</i> | <i>Units</i> | | | |
| <i>Volatile Organic Compounds (VOCs), continued</i> | | | | |
| trans-1,3-Dichloropropene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Ethylbenzene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 2-Hexanone | µg/L | 20 U | 20 U | 20 U |
| Isopropyl benzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Methyl tert butyl ether (MTBE) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK) | µg/L | 20 U | 20 U | 20 U |
| Methylene chloride | µg/L | 2.0 U | 2.0 U | 2.0 U |
| Styrene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2,2-Tetrachloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Tetrachloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Toluene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,2,4-Trichlorobenzene | µg/L | 2.0 U | 2.0 U | 2.0 U |
| 1,1,1-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| 1,1,2-Trichloroethane | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichloroethene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Trichlorofluoromethane (CFC-11) | µg/L | 0.50 U | 0.50 U | 0.50 U |
| Vinyl chloride | µg/L | 0.50 U | 0.50 U | 0.50 U |
| o-Xylene | µg/L | 0.50 U | 0.50 U | 0.50 U |
| m&p-Xylenes | µg/L | 0.50 U | 0.50 U | 0.50 U |
| <i>Metals</i> | | | | |
| Cyanide (amenable) | µg/L | 10 U | 10 U | 10 U |
| Cyanide (total) | µg/L | 10 U | 10 U | 10 U |
| Magnesium | µg/L | 28500 | 25000 | 25500 |
| Mercury | µg/L | 0.001 U | 0.001 U | 0.001 U |
| Sodium | µg/L | 23000 | 35300 | 22300 |

TABLE 3

**ANALYTICAL RESULTS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Sample Location</i> | <i>MW-107S</i> | <i>MW-108D</i> | <i>MW-108S</i> | <i>MW-109D</i> |
|-------------------------------------|-----------------------------|------------------------------|----------------------------|------------------------------|
| <i>Sample Identification</i> | GW-56393-102212-JV-100 | GW-56393-102212-JV-099 | GW-56393-102212-JV-098 | GW-56393-102312-JV-111 |
| <i>Sample Date</i> | 10/22/2012 | 10/22/2012 | 10/22/2012 | 10/23/2012 |
| <i>Sample Type</i> | | | | |
| <i>Screen Depth</i> | <i>Screen_Depth:</i> (8-13) | <i>Screen_Depth:</i> (40-45) | <i>Screen_Depth:</i> (2-9) | <i>Screen_Depth:</i> (22-27) |
| <i>Sample Elevation (feet AMSL)</i> | 695.76-682.76 | 663.39-618.39 | 701.32-692.32 | 689.41-666.41 |
| <i>Parameters</i> | <i>Units</i> | | | |
| <i>PCBs</i> | | | | |
| Aroclor-1016 (PCB-1016) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1221 (PCB-1221) | µg/L | 0.040 U | 0.040 U | 0.040 U |
| Aroclor-1232 (PCB-1232) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1242 (PCB-1242) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1248 (PCB-1248) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1254 (PCB-1254) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Aroclor-1260 (PCB-1260) | µg/L | 0.020 U | 0.020 U | 0.020 U |
| Total PCBs | µg/L | ND | ND | ND |

Notes:

U - Not present at or above the associated value.

J - Estimated concentration.

UJ - Estimated reporting limit.

R - Rejected.

TABLE 4

**SUMMARY OF QUALIFIED SAMPLE DATA DUE TO VIOLATION OF INITIAL CALIBRATION ACCEPTANCE CRITERIA
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Parameter</i> | <i>Compound</i> | <i>Calibration Date</i> | <i>RRF</i> | <i>Associated Sample ID</i> | <i>Qualified Sample Results</i> | <i>Units</i> |
|------------------|------------------|-------------------------|------------|-----------------------------|---------------------------------|--------------|
| VOCs | 2-Butanone (MEK) | 9/26/12 | 0.018 | GW-56393-102212-JV-098 | R | µg/l |
| | | | | GW-56393-102212-JV-099 | R | µg/l |
| | | | | GW-56393-102212-JV-100 | R | µg/l |
| | | | | GW-56393-102212-JV-101 | R | µg/l |
| | | | | GW-56393-102212-JV-102 | R | µg/l |
| | | | | GW-56393-102212-JV-103 | R | µg/l |
| | | | | GW-56393-102212-JV-104 | R | µg/l |
| | | | | GW-56393-102212-JV-105 | R | µg/l |
| | | | | GW-56393-102212-JV-106 | R | µg/l |
| | | | | GW-56393-102212-JV-107 | R | µg/l |
| | | | | GW-56393-102312-JV-108 | R | µg/l |
| | | | | GW-56393-102312-JV-109 | R | µg/l |
| | | | | GW-56393-102312-JV-110 | R | µg/l |
| | | | | GW-56393-102312-JV-111 | R | µg/l |
| | | | | GW-56393-102312-JV-112 | R | µg/l |
| | | | | GW-56393-102312-JV-113 | R | µg/l |

Notes:

R - Rejected

RRF - Relative Response Factor

VOC - Volatile Organic Compounds

TABLE 5

**QUALIFIED SAMPLE RESULTS DUE TO VIOLATION OF CONTINUING CALIBRATION REQUIREMENTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Parameter</i> | <i>Calibration Date</i> | <i>Compound</i> | <i>%D</i> | <i>Associated Sample ID</i> | <i>Qualified Sample Results</i> | <i>Units</i> |
|------------------|-------------------------|----------------------------------|-----------|--|--|--|
| VOCs | 11/1/12 | Chloromethane (Methyl chloride) | 32 | GW-56393-102212-JV-102 GW-56393-102212-JV-103 GW-56393-102212-JV-104 GW-56393-102212-JV-105 GW-56393-102212-JV-106 GW-56393-102212-JV-107 GW-56393-102312-JV-108 GW-56393-102312-JV-109 GW-56393-102312-JV-110 GW-56393-102312-JV-111 GW-56393-102312-JV-112 GW-56393-102312-JV-113 | 0.50 UJ 0.50 UJ | µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L |
| VOCs | 11/1/12 | Dichlorodifluoromethane (CFC-12) | 28 | GW-56393-102212-JV-102 GW-56393-102212-JV-103 GW-56393-102212-JV-104 GW-56393-102212-JV-105 GW-56393-102212-JV-106 GW-56393-102212-JV-107 GW-56393-102312-JV-108 GW-56393-102312-JV-109 GW-56393-102312-JV-110 GW-56393-102312-JV-111 GW-56393-102312-JV-112 GW-56393-102312-JV-113 | 0.50 UJ 0.50 UJ | µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L |

Notes:

UJ - Non-detect with an estimated report limit.

U - Non-detect

%D - Percent Difference

TABLE 6

**SUMMARY OF QUALIFIED SAMPLE DATA DUE TO METHOD BLANK CONTAMINATION
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Parameter</i> | <i>Blank Date</i> | <i>Analyte</i> | <i>Blank Result</i> | <i>Associated Sample ID</i> | <i>Original Sample Result</i> | <i>Qualified Sample Result</i> | <i>Units</i> |
|------------------|-------------------|---------------------------------|---------------------|--|--|---|--|
| VOCs | 11/1/12 | Chloromethane (Methyl chloride) | 0.13 J | GW-56393-102212-JV-102 GW-56393-102212-JV-104 GW-56393-102212-JV-105 GW-56393-102312-JV-108 GW-56393-102312-JV-111 GW-56393-102312-JV-112 GW-56393-102312-JV-113 | 0.090 J 0.080 J 0.090 J 0.13 J 0.18 J 0.070 J 0.070 J | 0.50 U 0.50 U 0.50 U 0.50 U 0.50 U 0.50 U 0.50 U | µg/L µg/L µg/L µg/L µg/L µg/L µg/L |
| Metals | 10/24/12 | Mercury | 0.30 J | GW-56393-102212-JV-098 GW-56393-102212-JV-099 GW-56393-102212-JV-100 GW-56393-102212-JV-102 GW-56393-102212-JV-103 GW-56393-102212-JV-104 GW-56393-102212-JV-105 GW-56393-102212-JV-106 GW-56393-102212-JV-107 GW-56393-102312-JV-108 GW-56393-102312-JV-109 GW-56393-102312-JV-110 GW-56393-102312-JV-111 GW-56393-102312-JV-112 GW-56393-102312-JV-113 | 0.61 J 0.43 J 0.54 J 0.43 J 0.31 J 0.34 J 0.34 J 0.37 J 0.21 J 0.38 J 0.54 J 0.23 J 0.41 J 0.66 J 0.52 J | 1.0 U 1.0 U | ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L ng/L |

Notes:

VOC Volatile organic compound
 J Estimated
 U Non-detect at associated value

TABLE 7

**SUMMARY OF QUALIFIED SAMPLE DATA DUE TO RINSE BLANK CONTAMINATION
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
OCTOBER 2012**

| <i>Parameter</i> | <i>Rinse Blank Date</i> | <i>Analyte</i> | <i>Blank Result</i> | <i>Sample ID</i> | <i>Original Sample Result</i> | <i>Qualified Sample Result</i> | <i>Units</i> |
|------------------|-------------------------|-------------------------------|---------------------|--|---|--|--|
| VOCs | 10/23/12 | Chloroform (Trichloromethane) | 0.74 J | GW-56393-102312-JV-108 GW-56393-102312-JV-110 | 0.090 J 0.14 J | 0.50 U 0.50 U | µg/L µg/L |
| VOCs | 10/23/12 | Toluene | 0.12 J | GW-56393-102212-JV-098 GW-56393-102212-JV-099 GW-56393-102212-JV-100 GW-56393-102212-JV-101 GW-56393-102212-JV-102 GW-56393-102212-JV-103 GW-56393-102212-JV-104 GW-56393-102212-JV-105 GW-56393-102212-JV-106 GW-56393-102212-JV-107 GW-56393-102312-JV-108 GW-56393-102312-JV-109 GW-56393-102312-JV-110 GW-56393-102312-JV-112 GW-56393-102312-JV-113 | 0.19 J 0.43 J 0.15 J 0.080 J 0.31 J 0.20 J 0.240 J 0.060 J 0.29 J 0.11 J 0.20 J 0.17 J 0.16 J 0.22 J 0.26 J | 0.50 U 0.50 U | µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L µg/L |

Notes:

VOC Volatile organic compound

J Estimated

U Non-detect at associated value